

# USING GREEN AND DIGITAL TECHNOLOGIES TO REDUCE FOOD WASTE AT THE CONSUMER LEVEL

## CASE STUDY: KAMPALA, UGANDA

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### Consumer food waste in Kampala

An estimated 37% of the households in Uganda and 20% of people in the capital Kampala live with food insecurity.<sup>1</sup> According to the Kampala Capital City Authority (KCCA), solid waste generation increased from 407,890 tons in 2011 to 785,214 tons in 2017; three-quarters of the waste is organic and biodegradable. Moreover, 28% of city-wide emissions come from landfills, waste incineration and solid waste management collectively, making the waste sector the second biggest contributor of greenhouse gas emissions in Kampala after energy generation.<sup>2</sup>

Food waste currently represents the largest part of solid waste generation in Kampala. The KCCA estimates that average household food waste generation in the city is 89 kg per person per year. Based on data collected as

part of this project, daily food waste in Kampala ranges from 0.241 to 0.447 kg per person. Low-income earners generally generate less food waste (average 0.26 kg/person/day) as compared to middle-income (0.40 kg/person/day) and high-income earners (0.50 kg/person/day).

The project found that in Uganda the absence of food waste regulations, inappropriate handling of food products, lack of food storage facilities, poor infrastructure, limited access to and high cost of electricity, inadequate food management practices and skills, and lack of understanding and awareness are the major causes of food waste.



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Urban farming accounts for about **35%** of food in Kampala.

<sup>1</sup> UBOS 2017 National Household Survey 2016/17.

<sup>2</sup> Oates, L., Gillard, R., Kasaija, P., Sudmant, A., Gouldson, A. 2019. "Supporting decent livelihoods through sustainable service provision: Lessons on solid waste management from Kampala, Uganda". Coalition for Urban Transitions. London and Washington, DC, [https://newclimateconomy.report/workingpapers/wp-content/uploads/sites/5/2019/04/CUT19\\_frontrunners\\_kampala\\_waste\\_rev.pdf](https://newclimateconomy.report/workingpapers/wp-content/uploads/sites/5/2019/04/CUT19_frontrunners_kampala_waste_rev.pdf).



## Tackling the waste problem

The Government of Uganda has put in place policy frameworks to prevent and reduce food loss and waste. The country's Uganda Vision 2040 overarching development plan underscores the need to reduce food loss and wastage and improve food safety. The Nation Development Plan III (NDP III) provides for the establishment of food technology incubators and a national food chain management system. NDP III also prioritizes agro-industrialization with the aim of creating jobs, making households food secure, and minimizing post-harvest food loss and waste. In the Agriculture Sector Plan (2015/16-2019/20), the government allocated over UGX 450 billion (\$127 million) to interventions that would directly address food loss and waste. These included an efficient Food Agricultural Statistics (FAS) system to support policymaking, and the promotion of new food processing technologies.

The Global Food Security Strategy (GFSS) Uganda Country Plan (2018) aims to address food waste at the processing stage. Under the 5th Schedule of the East African Community Customs Management Act (2004), Uganda gave tax exemptions to licensed hotels on importation of technologies, including those that relate to food waste (such as cookers, fridges and freezers, IT accessories and

software). In addition, the Environment Management Act (2019) calls to control waste generation to the greatest extent possible through the circular economy, while the KCCA Strategic Plan (2020) promotes urban agriculture to increase the supply of fresh food and vegetables, and support food handlers to minimize food contamination and associated food waste and loss.

A joint study by KCCA and the Uganda Ministry of Energy and Mineral Development assessed the quality of organic waste (biodegradable matter) for possible use as input to a proposed biogas plant for electricity generation. Another joint study by KCCA and the Korea International Cooperation Agency explored the possibility of treating and recycling food waste from markets for the purpose of converting to animal feed. Through a public-private partnership, KCCA is working with a company, PROTEEN (U) Ltd., to collect food waste from markets and feed it to black soldier fly larvae to produce high-quality protein for animal feed. Around 5-10 tones per week of food waste is collected from markets to feed the black soldier flies. KCCA is also piloting a project to separate food waste at the Usafi Market in Kampala where food waste is collected in different bins and sold as animal feed.



## Role of green and digital technologies

Green and digital technologies are increasingly being used in Uganda to address food waste, including in storage, recycling and preservation. Aseptic packaging is widely used in the food and beverage industry to extend shelf life. Micro-cold transportation is used to provide cold chain solutions to small business holders. Hotels are using mobile phone applications (Jumia Foods and Glovo) to allow customers to pre-order their meals, helping hotels better predict or estimate food demand for a given day. Hotels are also using QR code-based applications to allow customers to make orders directly to chefs.

The 2020 lockdown due to the COVID-19 pandemic led to an expansion of urban farming (which now accounts for about 35% of food in Kampala). Urban farmers have embraced the use of improved varieties of vegetables

with extended shelf life, which minimize food waste. With support from the European Union, KCCA launched the "Farm to Plate Virtual Market" (K-Smart Market, a digital mobile phone application) to facilitate urban farmers and food vendors to sell directly to consumers. This shortens the food supply chain and eliminates associated waste and loss.

Middle- and high-income earners are increasingly using home appliances with micro-computers or digital controllers to minimize food waste in the kitchen and during storage. The inevitable food waste, such as fruit and vegetable peelings, can be converted to energy through waste-to-energy technologies. The Kampala City Abattoir, for example, uses blood, fat and carcass waste to generate biogas for electricity. There are also emerging

projects in Kampala that are converting organic waste, including food waste, to produce briquettes for cooking and compost for urban farming.

The Fruiti-Cycle company has designed an electric tricycle with a refrigerated storage unit, which uses an evaporative cooling system that is solar powered, to prolong the shelf life of fresh produce during distribution. The storage unit is detachable and can be used in the local market by vendors to preserve their produce for up to five days. Sparky Dryer, an eco-friendly dehydrator built with steel and wood, runs on biofuel and burns with zero-carbon emissions to dry fruits, vegetables, cereals

and grains. It dehydrates foods five times faster than electric dryers and 10 times faster than open sun drying.

Scaling up such technologies can open up new opportunities for preventing and reducing food waste by informal retailers who lose about 30% to 40% of food they stock for sale. Challenges have been identified for further uptake of such technologies, including poor infrastructure (transport, electricity, ICT), lack of tech design and productive capacity, and shortage of experienced professionals with technical skills to harness green technologies for food waste management.



## The way forward

Addressing food waste requires lifecycle interventions instead of a singular action targeting a particular stage of the food chain. Interventions at the production and transportation stages can also help to reduce food waste in households. Data is key, especially data to illustrate the economic, environment and social costs and consequences of food waste. An enabling environment is needed, with more attention to the informal sector that works on food service and waste collection. It also needs to connect infrastructure, urban planning, economic incentives, capacity support and mandatory regulations into a holistic approach.

Given the role of women in the informal sector and in food consumption, such interventions should take into full consideration and systematically integrate gender equality into its planning and implementation. More support is needed to empower women to access green technologies, services and information and to participate in decision-making related to food waste. Financiers also need to improve finance for new technological innovations and business models. Researchers could fill in the gaps in data, technical standards, impact assessment, cost valuation, R&D and productive capacity. Civil society groups could leverage the latest findings in behavioural science and support grassroots campaigns to advocate for change in perception and lifestyle that relate to food consumption and food waste.



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